# The Mobility Therapist
# and
# The Non-Exclusive Mobility Model©

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Bruce B. Blasch, Ph.D.
Rehab R&D Center, Atlanta Veterans Affairs Medical Center
and
Clinical Associate Professor
Department of Rehabilitation Medicine
Emory University
Atlanta, Georgia USA

It is indeed an honor to be invited to address this very diverse group of mobility specialists. This is the third IMC I have attended and my congratulations to the planning committee and the program committee here in Australia. You have taken on a very difficult task and have done an outstanding job.

It is also very exciting to witness the spread of mobility throughout the world. I was fortunate to be one of the early students to attend the Orientation and Mobility Program at Western Michigan University. Since the early 1960's I have seen a great many changes, most of them have certainly been for the better. There have also been many issues that are discussed over and over again - basically reinventing the wheel.

In the late 1970's one of my career highlights was the opportunity to work with Dr. Rick Welsh, a true scholar, along with many other leaders in the field, to produce the textbook, "Foundations of Orientation and Mobility." Putting this textbook together forced us to look at the total area of mobility training. Since this book was published in 1980, the time has come to update the material. Currently, Dr. Bill Weiner and I are assuming the major responsibilities for "Big Red" as named by Dr Weiner and Dr. Welsh is the third editor. More than 15 years have gone by and many things have changed. We are again looking at the field of mobility and the future of the mobility specialist. My presentation today is what I believe to be the future direction of orientation and mobility instruction in the United States. The momentum for this change in direction is coming from many political and legislative changes in our country such as the American with Disabilities Act (ADA), consumer groups, limited resources, to mention a few. Another major influence is that the demographic data indicate that the majority of the visually impaired population has additional impairments. Many of the mobility strategies and devices are undermined when the individual also has impaired physical, sensory and/or mental capabilities. Therefore, as mobility specialists, it is imperative to develop a strategy or model that considers all factors that influence independent mobility and not limit our concerns to only the parameters of visual impairment. I want to be very clear that while this attitude is shared by many individuals, I am representing my perspective. I also want to emphasize that I believe that it is a positive change.

Based on this background, I would like to propose a mobility approach or model for your consideration. During the research and evolution of this mobility model dating back to 1968, I felt it was imperative to consider the implications of concomitant conditions. In considering the mobility implications of other similar disabling conditions such as stroke, amputation, and mental retardation, it became apparent that the mobility implications were not specific to only visually impaired individuals but all handicapped individuals. Thus, a better understanding of the total process of orientation and mobility training has led to an awareness of the fact that many non-visually impaired people with other disabilities not only are subject to similar mobility limitations but can also benefit from formal mobility training. Thus, an appreciation for the many dimensions of travel problems has been the basis for a non-exclusive model of mobility.

For the remainder of my time I will be discussing the role of the mobility therapist as opposed to the orientation and mobility specialist. The term therapist was chosen because of the potential in the United States to obtain third party payment (that's a way we refer to insurance or health care payments) for mobility services. The major difference would be that the Mobility Therapist would be providing mobility training to "sighted handicapped individuals" in addition to visually impaired individuals. In essence, the role of the mobility therapist would be the same but the population served would be much broader then that of the orientation and mobility specialist. While I am emphasizing the teaching of mobility to sighted handicapped individuals I will make reference to examples of teaching persons with a visually impairment. This non-exclusive approach to mobility instruction places emphasis upon the functional mobility consequences stemming from disabling conditions and individual characteristics rather than upon the diagnostic category of an individual's disability. For example, as a mobility therapist, it is more important to consider balance limitation than the fact that the mobility consequence may be caused from multiple sclerosis, cerebral palsy, or an amputation. The mobility therapist need not develop instructional programs specific to each disability or multiple disability group, but must have an understanding of the components of independent mobility, be able to make individual assessments of limitations and abilities, and identify appropriate instructional methods for each student. Therefore, the following non-exclusive model has been developed to illustrate the interaction of factors which influence independent mobility for visually impaired individuals, as well as other handicapped and multiply handicapped individuals.

If we can think of it in terms of a formula; $M_I = I - (P_c + E_c)$ where $M_I$ = **INDEPENDENT MOBILITY, I = INTERVENTIONS, $P_c$ = PERSONAL CONSTRAINTS and $E_c$ = ENVIRONMENTAL CONSTRAINTS.** I will discuss each of these factors that should provide a model of mobility that allows a frame work for the mobility therapist to begin to analyze and formulate a curriculum for teaching other individuals with a disability. This model and the teaching strategies are based on a two-year program to train the mobility therapist, pioneered at the University of Wisconsin in the USA.

I will begin with the **INTERVENTION COMPONENT**. In the past 50 years, orientation and mobility specialists have learned a great deal and acquired a unique body of knowledge as it relates to independent mobility. I would like to highlight those unique **INTERVENTION COMPONENTS** that are generalizable to other individuals with functional mobility limitations.

The **INTERVENTION COMPONENT** primarily involves training . Our mobility training primarily focuses on three general areas: devices, skills and strategies. We are all familiar with the many mobility devices such as the Electronic Travel Aids including the Laser Cane, Sonic Guide, Mowat Sensor, Sonic Pathfinder, and long canes, adaptive mobility devices and dog guides. However there are many other mobility devices such as wheelchairs, crutches and support canes. These devices range from the very simple to the very sophisticated.

The second area involves the acquisition of skills. Basically a skill as such is proficiency or mastery in the performance of some task. The task may be public speaking, driving a car, card playing, playing a musical instrument, or using a mobility device. The skills that are taught in mobility training are predominantly verbal and motor.

Finally, the area which mobility training is exemplary in the fields of rehabilitation and special education is the use of strategies. Strategies are generally thought of as an ingenious plan, method or effective way of getting a result. Many times individuals are forced to use their ingenuity to try some trick or alternative behavior to circumvent some obstacle. The best example of effective strategies I can think of are the long cane techniques and training The cane by itself as a device is just a piece of pipe or fiberglass and will not make a person independently mobile. It is the strategies of using the cane in a systematic fashion that gives the significance to the long cane. Once the strategies have been taught, trough a systematic curriculum of instruction, the individual then develops skill and proficiency in the application of these strategies employing the use of the long cane as a device.

There are several key factors to the intervention component in mobility that have proven extremely effective. One critical factor is providing **Individualized Instruction.** Training in independent travel requires individualized instruction. Because of the variety of components that are involved it is unlikely that any two students will be able to proceed at the same rate. Attempting to train two students at one time will result in danger for the students or inefficient training. Because part of the focus of mobility instruction must be on independence and individual problem solving, training with another person deprives one or the other of the students of the opportunity to learn to make decisions on their own and to bear their consequences, which the student will have to do when they travel independently. Individualized instruction also enables the mobility therapist to structure the situation to reflect the level of complexity that is most needed by a particular student at that time in training.

Mobility specialists have learned that instruction can be adequately provided only in **real environments** similar to those in which the student will travel later. While training in simulated and protected environments may be necessary for beginning instruction, it is not sufficient for the development of all needed skills. Real environments are qualitatively different from the hallways of institutions such as schools and hospitals. In real environments there is a bombardment of stimuli and a variety of competing concerns such as existing dangers, the reactions of passersby, the possibility of getting lost, and the preoccupation with the actual business of the trip. The method that has proven to be the best way to prepare for such situations is practice in the real environment

Since mobility instruction has concentrated on teaching in the real environment, the mobility specialist has developed a unique knowledge and approach to **environmental problem solving**. This is not dissimilar to the person who participates in the sport of orienteering. Based on the unique knowledge base, the mobility therapist applies the environmental problem solving strategies to individuals with other functional mobility limitations.

Another important teaching strategy in mobility training is the need for **lessons of graduated difficulty and responsibility.** Various components have to be broken out of the total mobility task and presented sequentially. It is important to develop certain basic skills before the student can be expected to deal with other people in travel situations. For example, the student should be able to handle less congested areas of travel before proceeding to more complicated areas. A student should also develop confidence in their own travel abilities before they work on the skills of soliciting and using assistance. While the particular sequence or approach may differ somewhat for individual students, and the approach used for persons with different disabilities may be found to vary from that which has been most helpful for visually impaired persons, mobility therapists should be expert in planning sequenced lessons of graduated difficulty and responsibility. Such skill is necessary for work with persons with all types of mobility limitations particularly as it relates to the development of the person's self-confidence in his travel abilities and the overcoming of any fears and anxieties that may exist.

Another common factor that has emerged in mobility training of the visually impaired is the **synthesis of skills** or said another way, the whole of independent travel is greater than the sum of its parts. No matter how expertly the student performs the various subskills in isolation, the various components frequently do not come together as smoothly as expected. Unless the student gets an opportunity to put it all together in practice situations with a mobility therapist available for feedback and assistance, it is likely that the student will not be able to learn to travel to their full potential, at least not as soon as they might with such professional training.

Finally, one of the most important elements of mobility training that has application to services for persons with various mobility limitations is the designation of mobility instruction as the primary **responsibility** of one or more full-time staff

members of an agency or program. Where mobility instruction of some sort is offered in programs for persons with limitations other than visual impairment, it is usually done by someone whose main responsibility lies elsewhere and who provides travel instruction only when time permits or when the need is so obvious and pressing that other duties must be put aside. Giving specific staff members responsibility for mobility instruction is an important step in the recognition and development of this service as an essential part of the program. The presence of mobility therapists in a program also indicates that someone in the organization, as a professional responsibility, will focus attention on this area and on the literature to learn how to improve the service. A designated person is able to devote their full attention to this service without the distractions of other responsibilities

Returning to the formula, $M_I = I - (P_c + E_c)$, functional mobility problems result from the interaction of the consequences of **Personal Constraints ($P_c$)**, with the external, **Environmental Constraints ($E_c$)** . Previously, general approaches to Interventions were discussed that could reduce the impact of the interaction of $P_c + E_c$, and the resulting functional mobility limitation. Before proceeding, I would briefly like to present a synthesis of the **PERSONAL CONSTRAINTS ($P_c$).** A sampling of disabilities and individual conditions, which influence independent mobility, indicate the commonalty of mobility consequences. Most disabling conditions result in one or more functional mobility limitations. Sensory disorders such as visual impairment, hearing loss, or vestibular damage for example, reduce the amount and type of environmental information an individual may gather through direct experience. Cognitive and perceptual disorders reduce the accuracy of this information or impair an individual's ability to store and retrieve such information efficiently.

As mentioned, some functional limitations may result from any number of disorders affecting sensory, circulatory, endocrine, central nervous systems, or from orthopedic disabilities. Ambulation may be impaired, for example, by vestibular defects, heart disease, arthritis, emphysema, mental illness, obesity, cerebral palsy, and so on. Simple identification of a diagnostic category, therefore, does not entirely indicate the mobility limitations to be expected. The degree of impairment, concomitant disabilities, and intervening variables such as experience, knowledge, and motivation will also affect performance abilities. After analyzing a very large sampling of disabilities and individual conditions, there seem to be certain factors that emerge as mobility consequences (Table II). These factors while considered separately are interdependent and arise either as a direct result of an individual condition, or indirectly through learning or intervening physiological, psychological or social processes. It is the configuration of these factors which ultimately results in the mobility limitation of a Personal Constraint, exclusive of the environment and any intervention.

TABLE I

$M_I = I - (P_c + E_c)$

**PERSONAL CONSTRAINTS**

I. COGNITIVE FACTORS

A. Concept Development
B. Problem Solving and Decision making Abilities
C. Orientation Abilities
D. Information Processing Abilities
E. Short-term and Long term Memory

I I . PSYCHOMOTOR FACTORS

A. Perceptual Abilities
B. Body Awareness (Body Image, Body Concepts and Body Schema)
C. Posture and Postural Sway
D. Balance
E. Gait
F. Endurance/Stamina
G. Strength
H. Flexibility
I. Agility
J. Perceptual/motor Coordination

III. PERSONALITY FACTORS

A. Self-Concept
B. Motivation
C. Lack of Confidence or Overconfidence
D. Embarrassment
E. Fear
F. Anxiety

IV. INFORMATION ACQUISITION FACTORS

A. Reading Abilities (e.g., utilizing Visual Symbols and Signs)
B. Listening Abilities (e.g., utilizing Communication, Warning Sounds)
C. Haptic Exploration Abilities

Cognitive factors influence one's ability to plan and execute routes through the environment to desired objectives, to maintain orientation, and to negotiate obstacles along the chosen route. The development of accurate body, spatial and environmental concepts has a significant impact upon mobility. Knowledge of body concepts and body awareness form the basis of spatial and directional concepts. These concepts and accurate environmental knowledge are central to the processes of orienting one's self to the environment and of being mobile (Hill and Blasch, 1980).

**Concept development** may be limited by sensory loss such as blindness, which directly limits the range of perceptual opportunities available to the individual. Very large objects (such as airplanes) or very small objects (such as microorganisms) cannot, for example, be directly experienced. Experiential factors such as limited exposure to the environment occurring as an indirect result of a disability may also limit concept development. The child with cerebral palsy, for example, may lack the motoric ability to explore the home or neighborhood, and have little opportunity to generalize familiar concepts beyond the immediate environment.

Deficiencies in the ability to solve problems that arise during travel and difficulties in making the decisions necessary for safe and efficient movement sometimes result from concept deficiencies. Anxiety or a lack of confidence in one's own problem-solving ability also impact negatively upon effective **problem solving and decision making**. Cognitive impairments may directly affect reasoning ability which is fundamental to problem solving. For some cognitively impaired persons, however, difficulties result as much from limited opportunities to make decisions and experience their consequences as from the presence of intellectual deficits. without such experiences, problem solving skills do not generally develop (Hughes, Smith and Renitz, 1977).

**Orientation abilities** are largely dependent upon accurate environmental concepts, psychomotor factors and problem-solving abilities. Mobility specialists have long recognized the importance of utilizing the information available to the individual in establishing one's position in and relationship to the environment. Yet many handicapped individuals may have been deprived of the opportunity to actively maintain their orientation because of an overprotective parent leading their child passively from one place to another. This passive response to the environment is not restricted to visually impaired individuals but is just as evident with mentally retarded children, deaf children, children with cerebral palsy and any child who has been overprotected.

Another important cognitive factor is the ability to **process information**. This ability has assumed some of the following labels: reasoning; thinking; and mediation, depending on the particular theoretical frame of reference. It is not our role to decide which label is most appropriate but rather to understand that people may process information differently and to maximize the effectiveness of this ability as it relates to independent mobility.

Obviously, information processing is interrelated to the factors just discussed as well as to **long and short term memory**. We have worked with many principles to reduce forgetting such as: recitation of directions; distribution of practice; over learning a skill or concept; amount of information presented is equivalent to rate of learning ability; and motivation for learning or remembering a mobility activity. Long and short term memory is as important to the independent mobility of the visually impaired traveler as it is to the brain injured, learning disabled or mentally retarded individual.

The second area of mobility consequence involves **psychomotor factors**. Psychomotor factors include sensory-perceptual abilities, body awareness, perceptual motor coordination, posture and gait, balance, strength, stamina, and endurance, flexibility and agility.

In order to travel independently, safely and efficiently one must have **perceptual abilities** or the ability to take in, interpret and react to information about the environment through which one is moving. Sensory-perceptual deficiencies occur due to sensory loss, for example, impaired vision or hearing; or due to sensory disturbances such as disturbed perception of the vertical or horizontal following stroke (Lorenz and Cancro, 1962, DeCencio, Leshner and Voron, 1970). Individuals who have had amputations also lack proprioceptive information regarding limb placement and may experience some impaired movement skills such as balance difficulties as a result. When sensory and proprioceptive systems are intact, impairments in the ability to direct one's movement may stem from central nervous system disorders or peripheral neurological damage. Perceptual motor disturbances are manifested as apraxia, poor eye-hand/foot coordination, impaired depth perception or other performance deficits. With some children diagnosed as learning disabled the primary programming revolves around improving perceptual abilities. Proprioceptive awareness of the location of one's body parts or body schema (Frostig, 1970) provides the basis for physical activity and purposeful movements directed by sensory awareness of the environment.

Learning disability, for example, may result in inadequate or disturbed **body awareness**. Many professionals maintain that body awareness (i.e. body image, body concept and body schema) is central to the development of concepts and to the process of orienting oneself to the environment and to being mobile. Obviously, the negative effects to the development of body awareness is not restricted to only visual impairment but many other disabilities may produce similar effects.

Directly and indirectly, many impairments result in deficiencies in **posture and gait**. We are all aware of the effects that insecurity, blindness and low vision have on posture and gait. Neurological and skeletal muscular disorders directly affect an individual's ability to ambulate. Other impairments indirectly affect posture and gait through the difficulties an individual has perceiving correct posture or adjusting his or her own posture in relation to the true vertical (Blasch and Welsh, 1980). In some cases, distinctive postures and gaits result from institutionalization where the abnormal gait and postures of others are imitated (Haring and Scheifelbush, 1967).

**Balance** or the ability to maintain one's equilibrium in relationship to the force of gravity in both static and dynamic movement situations may be affected by all of the psychomotor factors just discussed. Obviously, balance must be considered as one of the factors important to mobility. Strategies for maintaining balance must be implemented as in the example of the visually impaired, cerebral palsied individuals as well as individuals in wheelchairs. and using other devices. The importance of balance becomes more vivid for the mobility specialist when the consequences of falling into traffic are considered.

**Strength, stamina and endurance** may also directly or indirectly result from disabling conditions. Impaired neuromuscular function (e.g., spinal cord injury or multiple sclerosis) or impaired circulatory and respiratory capacity directly affect strength and stamina. The stigmatizing nature of visible disability, poor self-concept or anxiety related to travel, indirectly affect an individual's development of strength and endurance if he/she is unwilling to travel in the community.

**Flexibility and agility** are also involved in independent mobility. Flexibility concerns the range of motion in the joints that the individual is capable of achieving. Therefore. a high degree of flexibility is needed to perform efficient mobility and to minimize injury. Agility involves the individual's ability to implement movement quickly implying dexterity and quickness. Components of agility include fast response times, manipulation abilities, rapid change of direction, and starting and stopping quickly.

All of the above factors are involved in **perceptual-motor coordination**. Perceptual-motor coordination may be regarded as the integration of motor and sensory systems into a harmonious working together of the body parts. Some individuals have difficulty in directing their movements based upon the sensory information they receive. The problem does not exist in the receptive mechanisms but rather in the person s ability to produce accurate movements based upon the information received. This can cause difficulties in locomotion as well as in driving a vehicle. Because of a lack of or a distortion of sensory input some individuals may need a very structured and systematic presentation of stimuli to facilitate perceptual motor coordination.

Personality Factors is a third area of importance to the mobility specialist. Personality factors may present serious obstacles to independent travel. For many disabled individuals there is a complex interaction between independent travel and the personality factors. Immobility itself can lead to feelings of dependency, isolation, hopelessness and a poor self-concept. On the other hand success in independent travel can improve self-concept, bring about a greater sense of independence and increase motivation for travel and other tasks (Welsh 1980).

A major factor is the individuals **self-concept**. Generally self-concept is considered as the set of perceptions and feelings that an individual holds about themself (i.e. an internal score card or final evaluation). The origin and development of self-concept may be strongly influenced by such factors as: attitudes of significant

others, a feeling of competence, similarity to other people, and effectiveness of personal actions.

**Motivation** is one of the personality factors that is of central importance to mobility. We have all cited motivation as the reason for why a student is more or less successful in his mobility training. A lack of motivation may have been interpreted as dependency a poor self-concept a lack of adjustment or fear. Because of continued failure or behavior that is inconsistent with the student s level of aspiration motivation for independent mobility may be lacking. The success of mobility has been based on the graduated difficulty of the lessons to build success and reinforce the feelings of confidence to stimulate the motivation for expanded independent mobility.

Another factor closely related to motivation is the individual s **confidence level.** Many individuals lack confidence in their abilities as a disabled individual to negotiate the environmental constraints they will encounter. This lack of confidence undermines motivation and self-concept and reinforces feelings of dependency, inadequacy and helplessness. Over-confidence on the other hand may put the individual in a dangerous situation or situation of unnecessary risk. Such situations may lead to embarrassment fear anxiety or to an unfounded poor self-concept.

Another factor that is associated with motivation and self-concept is **embarrassment**. Because of mobility training. this may be the first time the student has had to deal with the reactions of the general public on this own. Prior to this time a parent (guardian spouse or professional may have acted as a buffer shielding the handicapped individual from the reactions of others. The individual may have traveled with groups of other handicapped persons therefore diffusing the potential of personal embarrassment. The potential for the embarrassment of falling or exhibiting inadequacy may be the primary factor undermining the motivation for independent mobility.

The final personality factors frequently associated with independent travel are **fear and anxiety**. To differentiate the two, fear is generally considered a reaction to a clearly perceived threat or danger which frequently results in avoidance behavior. Anxiety seems to be a more diffuse reaction to a general threat to the Individual and does not generally result in avoidance (Welsh, I980).

The final area of mobility consequences involves **information acquisition factors.** As mobility specialists we are aware of the importance of the ability to gain information about the environment. The importance of haptic abilities or the combined use of touch and kinesthetic feedback for visually impaired individuals are recognized. Yet this same information source may be completely disregarded for the individual with learning disabilities or brain injury. In a similar fashion the ability to utilize auditory information for independent mobility may be best understood and enunciated by mobility specialists. Yet this ability may be completely neglected by the individual in a wheelchair with a spinal fusion of the neck. Because he is unable to visually scan an intersection, he is dependent on others to cross the street. Unfortunately, no one has

considered the use of auditory training that mobility specialists for visually impaired individuals routinely employ.

Finally, the ability to utilize vision to read, not in the traditional sense used in elementary schools, but rather the ability to interpret signs, maps, clocks, landmarks, and directional indicators commonly used in independent mobility. These information acquisition factors briefly alluded to, as well as the cognitive, psychomotor, and personality factors are important components to be considered when evaluating the mobility consequences and potential of each handicapped individual.

Obviously it is impossible to consider the individual and totally disregard the environment in which the individual functions or hopes to function. Returning to the formula, $M_I = I - (P_c + E_c)$, I have discussed the **Intervention (I)** and **Personal Constraints ($P_c$).** I would briefly like to present a synthesis of the **Environmental Constraints ($E_c$)** .

With reference to the proposed mobility model, it is the consideration of the interaction of the specific individual in the specific environment which may or may not result in a functional mobility problem. This interaction is often disregarded and we only consider the success or failure or the handicapped individual to achieve in the environment we use in our mobility programs. Therefore, it is imperative to consider many of the environmental features relative to pedestrian mobility. While there is not time to go into detail, I have gone through an extensive sampling of environmental features. I have tried synthesize this information and divide the environment into physical environmental factors and social environmental factors. Physical environmental factors include characteristics of the "built" environment, regional physical features such as terrain, weather and air quality, and situational factors such as pedestrian congestion, regulations and traffic laws. Social environmental factors include family attitudes, the attitudes and reactions of others, and the common language and symbol system .

The external consequences are synthesized in Table II. For expediency, I have added examples under each of the areas. For example, elevation changes under the heading of "Surfaces" would include stairs, ramps, and curbs. It is imperative that as mobility specialists we consider all factors of the environment as well as the effect on all disabled individuals. Hopefully in the future, we can avoid errors such as building curb ramps for the wheelchair user only to create additional problems for the visually impaired individual. The solution to this problem is as simple as building the curb out further from the parallel street, offset from the sidewalk line. The cost for such ill-thought out modifications is not only expensive financially but also in terms of public regard for handicapped individuals and professionals in the area of rehabilitation and special education.

Each of us has limits in terms of the type of environmental features we can negotiate. For example, in those periods of our lives when our physical and mental capabilities are less than ideal--early childhood, temporary periods of disability and old

age—we experience handicaps of varying degrees in the environment. While most people pass through stages of ability and disability, some persons experience serious permanent limitations in ordinary environments which have been constructed with the ideal, able-bodied traveler in mind (Morgan, 1976). Commonly identified environmental barriers include such features as curbs, stairs, and turnstiles. Architectural features which pose obstacles to some disabled individuals, however, may present no difficulties to others. An individual with impaired vision may experience no limitations negotiating stairs in a subway station but may become disoriented on the subway platform due to dim lighting and distorting sounds.

Features of the built environment may also present psychological barriers to disabled person. Wheelchair ramps which permit access through the rear of the building, or '"accessible" toilet stalls which are not deep enough to permit the door to be closed behind a wheelchair do not provide physical access that can be used with dignity (Morgan, 1976). As a result, many disabled persons choose to stay at home in spite of the efforts which may have been made to eliminate architectural barriers.

Situational factors may compound the difficulties of independent travel for some individuals. Pedestrian congestion may pose problems for the individual with balance limitations. Traffic laws such as those permitting cars to turn on the red light may confuse the individual with limited ability to understand pedestrian and traffic flow patterns. Severe weather conditions such as air pollution are other features of the physical environment which may reduce the possibilities of travel for some individuals such as those with cardiac or respiratory disorders. Individual limitations may be further exaggerated in the presence of certain social environmental factors.

Independent mobility requires social interaction and the cooperation of other persons. This may be especially true for the disabled individual who may require the assistance of others in a number of travel situations. Interaction is often complicated by the fact that the disabled person is stigmatized by a visible impairment. Expressions of sympathy and curiosity and offers of unnecessary assistance may he difficult to repel tactfully. Family attitudes such as fear, low or unrealistic expectations, or the desire to protect the disabled person from exposure to the dangerous and embarrassing aspects of travel may discourage the individual from traveling independently and developing the necessary strategies for effective social interaction and environmental negotiation (Blasch & Welsh, 1980).

As it has been suggested, there are two points of intervention for improving independent mobility. First, the functional abilities of the individual may be enhanced by providing individual mobility training (strategies to compensate for functional limitations) or by prescribing mobility devices. Second, environmental demands may be lessened by removing environmental/social barriers. Functional mobility problems are diminished or eliminated when individual characteristics (i.e., abilities, motivation) are developed to overcome environmental factors and/or environmental characteristics (i.e., structural, dynamic, social factors) are changed to offset the limitations of the individual.

TABLE II

$M_I = I - (P_c + E_c)$

## ENVIRONMENTAL CONSTRAINTS

I . PHYSICAL DIMENSIONS
- A. SURFACES
  1. elevation changes
  2. texture: rough, slippery, uneven
  3. gradients: slopes, inclines, declines, cross-slopes
  4. resistance: 1 inch of sand vs 6 inches of sand
- B . MOVEMENT SPACE
  1. inadequate or restricted movement apace: permitting movement in one direction only, pushed by crowds
  2. distances
- C. SENSORY STIMULATION LEVELS
  1. illumination/reflection
  2. ambient noise levels; masking sounds, echo
  3. complex stimuli; congestion, complex traffic/pedestrian flow patterns
  4. signage: contrast, character size
  5. auditory communications: volume
  6. external inertial forces: acceleration/deceleration
- D . TRANSPORTATION
  1. escalators, elevators
  2. buses, taxi's, cars
  3. subways, trains
  4. .airplanes
- E . CLIMATE FACTORS
  1. temperature and temperature differentials: indoor/outdoor
  2. air quality
  3. wind velocity
  4. precipitation
- F. NEEDS APPARATUS
  1. toilet
  2. water fountain
  3. rest areas: benches
  4. safety features: guardrails, barricades, handrails

II. SOCIAL DIMENSIONS
- A. FAMILY ATTITUDES
  1. overprotection
  2. low expectations
  3. rejection, unrealistic expectations
- B. ATTITUDES OF OTHERS
  1. avoidance
  2. over solicitous attention
- C. COMMUNICATION

Based upon the assessment of the interaction of the individual and the environment, the specific mobility problems may be isolated. The mobility specialist in cooperation with a multidisciplinary team may then look at solutions. Many individuals have suggested that environmental modifications will be the major solution. In some cases this may be true. However I maintain that Interventions as can be provided by the mobility therapist will have a major role. Indeed, the solution will probably be a combination of mobility training and environmental modifications.

Figure III illustrates the application of this model in the example of a person with visual impairment and cerebral palsy. The mobility consequences used in this case are lack of perceptual motor coordination and poor balance. A common observation among individuals with cerebral palsy is that poor motor control is exaggerated in the presence of excessive stimuli or when the individual feels anxious or fearful. A sequential instructional program in the use of the long cane and the intermittent use of an orthopedic cane (i.e., on slippery surfaces) moving from a sheltered indoor environment to a congested business area allows the individual to master skills in the mobility strategies and gain the self-confidence to use them in actual independent travel situations.

One factor, for example, which may elicit anxiety in an individual with cerebral palsy and thus aggravate poor motor control is public attitude and consequent avoidance, inappropriate comments or staring. The individual's ability to accomplish mobility-related tasks may be impaired and the individual may fall frequently on unexpected curbs or have difficulty manipulating the cane, door knobs, or money. By providing graduated exposure to the public response to the visible disability, the individual may be "desensitized" to the public attitudes, learn effective cane skills and master the complex psychomotor and cognitive tasks of traveling safely, and independently in the community.

Therefore the mobility therapist is able to intervene and provide the individual with success in traveling for example in quiet areas. With success there is less anxiety and with less anxiety the individual has greater motor control. With greater motor control the individual is able to advance to more difficult tasks. Thus there is an upward spiral of motor control and successful independent mobility rather than the previous mobility failures and downward spiral.

As an approach to mobility instruction, I believe this model provides a framework from which the mobility problems of all handicapped individuals can be viewed. As professionals familiar with the concepts of mobility instruction for visually impaired persons, I hope you will find this model applicable to both singly and multiply impaired blind individuals. I have found the greatest value of this model as an approach to dealing with the latter group. Multiply impaired individuals present a broad range of functional abilities and limitations and cannot generally benefit fully from the formalized methods of mobility instruction developed with only singly handicapped, visually impaired persons in mind. Mobility services based upon the model and training methods presented may assist visually impaired and non-visually

impaired disabled persons in developing the strategies necessary to independently negotiate the physical and social environment, and thus may bring them into the mainstream of society.

In summary, there has been a tendency to disregard the mobility problems of other handicapped groups based, perhaps, on the assumption that these individuals are able to teach themselves how to travel. Because many handicapped individuals go to hospitals and clinics and receive physical and/or occupational therapy and instruction in the use of various prosthetic devices, this assumption is reinforced. In addition. many handicapped individuals are independently mobile. We see them on the streets and in public places. This situation is not unlike that of a visually impaired person prior to formal mobility programs. Some had been able to teach themselves how to travel through the community and some still do.

Many visually impaired individuals, however, for a variety of reasons are unable to achieve this goal on their own. Formal or systematic mobility services have been developed to guarantee each individual the opportunity to learn how to travel to the fullest extent of his abilities. Without a formal educational system, some individuals (handicapped and nonhandicapped) would still learn about the world and how to interact with it. However, steps must be taken to assure that each person will have this opportunity and that the acquisition of knowledge is not left to chance. Similarly, it is important not to assume that every handicapped person will develop independent travel skill without structured intervention. It must be emphasized, however, that just because a person has a handicap or is old they will not necessarily need mobility training.

The opportunity for formalized orientation and mobility instruction must be provided for all handicapped, multiply handicapped and elderly persons who need such assistance. This is necessary if we are going to be consistent with policies to integrate such people into the mainstream of our society more readily. Making policies, changing the environment, and developing new equipment is not enough. Appropriate learning experiences must be provided when needed.

In the United States as in most other countries, the population of visually impaired individuals is changing. Over 50% of the legally blind individuals are over the age of 65 and about 50% of all legally blind people are multiple impaired or have more than one disability. Yet many, not all, of our professionals and professional preparation programs are only dealing with the mobility problems associated with visual impairment.

As mobility specialists we have an obligation to offer mobility services to all visually impaired individuals not just the "easy students" or an elite few. Therefore, we have a professional responsibility to gain further knowledge about the mobility consequences of other disabling conditions and the interaction effect with visual impairment. Finally, knowing the significance and benefits from systematic mobility

instruction provided by a trained mobility specialist can you in good conscience deny this service to other handicapped individuals?

Thank you for the opportunity and privilege of being at this significant conference.

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